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Spectroscopy of Hf-178m2 with White Beam

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Beamline(s): X15A

Introduction: Experimental evidence suggests that it is possible to trigger gamma emissions from the 31-year Hf-178m2 isomer using incident photons. This experiment basically seeks to reproduce the referenced experiment with two enhancements: using the X15A beamline in white beam mode instead of a bremsstrahlung source and increasing the spectrum collection time to over 11 hours per case.

Methods and Materials: The Hf-178m2 target was encapsulated in beryllium held in an aluminum frame. The target was placed in the beam path and monitored with a 10% HPGe detector. Spectra were collected for three cases: beam on, beam off, and beam on but with the target repositioned by a stepper motor so that the beam no longer passes through the hafnium.

Results: No clear indicators of triggering (new or enhanced peaks) were identified.

References: *Accelerated Emission of Gamma Rays from the 31-year Isomer of ^{178}Hf Induced by X-Ray Irradiation*, Physical Review Letters 82:4, 695 (25 January 1999).